



Transmission potential of chikungunya virus and control measures: The case of Italy

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Abstract:

During summer 2007 Italy has experienced an epidemic caused by Chikungunya virus - the first large outbreak documented in a temperate climate country - with approximately 161 laboratory confirmed cases concentrated in two bordering villages in North-Eastern Italy comprising 3,968 inhabitants. The seroprevalence was recently estimated to be 10.2%. In this work we provide estimates of the transmission potential of the virus and we assess the efficacy of the measures undertaken by public health authorities to control the epidemic spread. To such aim, we developed a model describing the temporal dynamics of the competent vector, known as *Aedes albopictus*, explicitly depending on climatic factors, coupled to an epidemic transmission model describing the spread of the epidemic in both humans and mosquitoes. The cumulative number of notified cases predicted by the model was 185 on average (95% CI 117-278), in good agreement with observed data. The probability of observing a major outbreak after the introduction of an infective human case was estimated to be in the range of 32%-76%. We found that the basic reproduction number was in the range of 1.8-6 but it could have been even larger, depending on the density of mosquitoes, which in turn depends on seasonal meteorological effects, besides other local abiotic factors. These results confirm the increasing risk of tropical vector-borne diseases in temperate climate countries, as a consequence of globalization. However, our results show that an epidemic can be controlled by performing a timely intervention, even if the transmission potential of Chikungunya virus is sensibly high.

Source: <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3086881>

Resource Description

Communication: ☒

resource focus on research or methods on how to communicate or frame issues on climate change; surveys of attitudes, knowledge, beliefs about climate change

A focus of content

Communication Audience: ☒

audience to whom the resource is directed

Policymaker

Exposure : ☒

weather or climate related pathway by which climate change affects health

Climate Change and Human Health Literature Portal

Meteorological Factors, Temperature

Temperature: Fluctuations

Geographic Feature: ☒

resource focuses on specific type of geography

None or Unspecified

Geographic Location: ☒

resource focuses on specific location

Non-United States

Non-United States: Europe

European Region/Country: European Country

Other European Country : Italy

Health Impact: ☒

specification of health effect or disease related to climate change exposure

Infectious Disease

Infectious Disease: Vectorborne Disease

Vectorborne Disease: Mosquito-borne Disease

Mosquito-borne Disease: Chikungunya

Intervention: ☒

strategy to prepare for or reduce the impact of climate change on health

A focus of content

Mitigation/Adaptation: ☒

mitigation or adaptation strategy is a focus of resource

Adaptation

Model/Methodology: ☒

type of model used or methodology development is a focus of resource

Methodology

Resource Type: ☒

format or standard characteristic of resource

Research Article

Timescale: ☒

time period studied

Time Scale Unspecified

Vulnerability/Impact Assessment:

resource focus on process of identifying, quantifying, and prioritizing vulnerabilities in a system

A focus of content